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January 8, 1949

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Growing Cold Germs

See Page 19

A SCIENCE SERVICE PUBLICATION

$5.50 A YEAR

VOL. 55 NO. 2

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MEDICINE

Cold Germs from Clothes

Germ-carrying dust particles from clothing and skin are more numerous than the germs sprayed by a hearty sneeze, laboratory tests show.

➤ THE AIR gets more germs in it from dust off clothing and skin than from a good hearty sneeze.

Each person in the course of his normal activities looses a barrage of about one million bacteria-carrying dust particles per day.

These observations bearing on the spread of colds and other diseases through germs in the air were made by two Scottish bacteriologists, J. P. Duguid and A. T. Wallace, of the University of Edinburgh. American disease fighters will be reading details of the Scottish experiments in the LANCET (Nov. 27), medical journal published in London.

Many of the dust particles from skin and clothing may remain in the air for over half an hour, the Scottish scientists found. These dust particles, they think, are at least as good as sneeze-produced droplet nuclei in supplying the physical means for air-borne spread of disease. The droplet nuclei are tiny solid residues evaporated from small droplets. The nuclei stay in the air for several minutes or hours after droplets are sprayed or sneezed into the air. The larger droplets fall out of the air within one or two seconds.

Part of the Scottish experiments were made with two persons known to be harboring *Staphylococcus aureus* germs in their noses. Some of these staph. germs cause food poisoning, some cause boils, some cause what the layman calls blood poisoning. In the experiments the staph. carriers were in a small, closed room that was carefully guarded against any germs or bacteria except those of the carriers.

They went through the motions of certain laboratory procedures, to see how many dust particles would be let loose from their skin and clothing in the course of normal activity. To get the effect of vigorous activity, they "marked time" at walking pace continuously for 10 minutes, swinging the arms and raising the feet. And they tickled their noses with cotton wool swabs to bring on vigorous sneezes in quick succession.

Samples of the air after several tests with activity and sneezing were examined. From 840 cubic feet of air contaminated by 42 vigorous sneezes only 16 droplet nuclei carrying staph. germs were recovered. But 124 dust particles carrying these germs were recovered from 150 cubic feet of air contaminated by vigorous bodily activity for 150 minutes.

Surgeons will be interested in the finding that the loose cotton gown usually worn in operating rooms was not able to prevent bacterial contamination of the air from the skin and clothing.

"Our present findings," the scientists state, "show that a large amount of dust-borne bacterial contamination of the air may be caused by ordinary body movements, and that some of the infected dust particles may remain air-borne for a time more than sufficient to allow their drifting to the operating table from all parts of the theatre (operating room) and from rooms and corridors adjoining."

Instead of the usual operating gown, the scientists recommend a modified "boiler suit," consisting of a zipper-closed one-piece garment of heavy close-woven cotton twill with elastic bands over the cuffs of the long sleeves and heavy canvas socks sewed to the bottom of the trouser legs and worn over the shoes. This, they found, allowed only four percent of the air contamination in vigorous activity given in comparable experiments without gowning. They plan to wear this boiler-suit themselves in further studies of air contamination, to rule out the germs they themselves may be introducing into the samples they test.

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MATHEMATICS

Math May Decide Strategy

➤ THE BATTLE is the pay-off in war, but whether or not to enter a battle or a campaign in the first place may be the crucial decision. In the future, such decisions may be in the hands of mathematicians rather than generals.

At the staid meeting of the American Mathematical Society at Ohio State University in Columbus, O., the curtain was lifted on some of the involved mathematics now being invented to aid in solving such strategic problems.

The mathematics of games and the chances of one set of players winning or losing against another set of players, both following rules and perhaps making mistakes, was the subject of two papers. However, you still cannot get a perfect system of gambling from the mathematicians that will guarantee that you will break the bank.

The modern theory of games is based on the idea that with what limited knowledge you may have, in a given stage, of the rules of the game and of your opponent's position, you can decide upon the next move or play that will be the best for you. By playing in this manner, you will have the greatest chance of winning.

How to do this with assurance leads into the complicated mathematics of the two papers given: Isomorphisms of Games and Strategic Equivalence, by Prof. J. C. C. McKinsey, Rand Corporation, Santa Monica, Calif., a contractor to the National Military Establishment; and Continuous Games with Polynominal Pay-off Functions, by Dr. Melvin Dresher, also of the Rand Corporation.

Prof. McKinsey investigated under what circumstances the mathematical theory of games may be applicable to a problem of strategy and reported his highly technical mathematical findings.

Theory of continuous, two-player games of a certain kind in which successive moves are made was discussed by Dr. Dresher. On the basis of the habitual moves, or characteristic mistakes of the opponent, the optimum moves were defined. Dr. Dresher's complicated mathematical formulae will give the first player the maximum long-run pay-off.

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AERONAUTICS

Ram-Jet Helicopter Under Construction

➤ A HELICOPTER with ram-jet engines on the tips of its lifting rotary blades is under construction in England, but the builder and construction details are held confidential for security reasons.

The design of this secret helicopter also provides more efficient means for forward speed than any similar construction which is being built outside Britain, it is said.

Essential advantages are claimed for the use of ram-jets for driving helicopter rotors. Principally, the blade tips move at a speed high enough to make the engines operate. Ram-jets must have an initial speed of some 300 miles an hour or over to operate because they rely upon speed to scoop up enough air to support combustion. They are the simplest and most advanced jets, but must be used as supplementary to take-off power.

Another important helicopter matter in Britain was the recent trial flight of Cierva Air Horse, a 24-passenger, three-rotor craft that can cruise at 116 miles an hour for a distance of 232 miles. A two-seat Cierva has also been flight tested. A Fairey Gyrodyne and a Bristol Type 171, both helicopters, successfully passed flight tests during the past months, the first setting up a new record for rotor aircraft by achieving a speed of slightly over 124 miles an hour.

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MEDICINE

Test Detects Cold Virus

This chemical procedure will speed-up studies looking toward drugs or a vaccine to conquer the common cold. Human volunteers are aiding the study.

See Front Cover

➤ A DRUG to cure the common cold or a vaccine to prevent it may come faster, thanks to a chemical test developed by two U. S. Public Health Service scientists, Drs. Leon T. Atlas and George A. Hottle of the National Institutes of Health in Bethesda, Md.

The test detects the presence of the common cold virus and tells how much of it is present in a given sample of material. When certain chemicals are added to virus-containing material a pink to brown color develops. A very light pink color means a little virus. A very deep brown means lots of virus. To determine the exact amounts scientists measure the intensity of the color with an instrument called a spectrophotometer. The chemicals used are tryptophane, an amino acid, and perchloric acid. Details of the testing procedure were reported in the journal, SCIENCE (Dec. 31).

The speed-up on work toward a cure or preventive for the common cold comes from the fact that with this test scientists can do as many of certain procedures in one routine day as have so far taken two years.

First steps in trying to make a vaccine against a disease are to isolate the germs causing it and grow them outside the body in large quantities. In the case of colds, this can be done by washing out the nose of the cold victim with milk and growing this material on fertile hen's eggs. On the cover of this week's SCIENCE NEWS LETTER a fertile egg is shown being inoculated with common cold virus.

But the only way scientists have had so far of knowing whether the cold virus was present in the material from the victim's nose, or had grown on the eggs, was to spray some of it in a healthy person's nose and wait to see whether he got a cold.

And if they wanted to know how much virus is needed to cause a cold, essential for development of a vaccine, they had to spray different dilutions of virus-containing material in different noses and again wait to see whether colds developed.

These tedious, time-consuming procedures will be eliminated by the new test. Human volunteers will still be needed for some phases of cold research. Examples Dr. Atlas gave are recognizing the various agents which may cause colds, studying susceptibility to fresh colds, the length of time a cold lasts, and the effect of drugs, climate and various other factors on attacks of colds and their course.

Tests of aureomycin, new mold remedy, as a cold cure and of diluted virus as a vaccine are planned.

The chemical test has been successful in detecting and measuring a virus called MR 1. Decoded, this means Minor Respiratory 1. It is the code name given the virus which Dr. Atlas and Dr. Norman Topping of the National Institutes of Health announced just a year ago (*See SNL*, Jan. 24, 1948). Dr. Atlas got it from the nose of a scientist to whom he was giving a physical examination preliminary to a U. S. Public Health Service fellowship.

With the aid of 500 volunteers among inmates at Lorton Reformatory, District of Columbia penal institution, Drs. Atlas and Topping made sure that this virus definitely causes colds. Because it may not be the only virus that causes colds, or what the scientists term minor respiratory diseases, they have given it the number, "1", to identify it.

Dr. Atlas hopes that the new test will enable him and fellow scientists to isolate and study other viruses that may be causing the minor respiratory diseases now lumped under the name of a cold.

The test might be made specific for each virus, not only of colds but of other diseases such as infantile paralysis, measles and so on. If so, it would speed new knowledge for fighting these diseases. Its potential usefulness in this way comes from the fact that it is based on a chemical difference between infected and non-infected fertile hen's eggs, probably on the chemical composition of viruses in general and not a specific virus.

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ASTRONOMY

14 Comets Found in 1948

➤ "THE YEAR 1948 was another record-breaking one for comet seekers," Dr. Fred L. Whipple of Harvard Observatory revealed at the meeting of the American Astronomical Society in New Haven, Conn.

Fourteen comets were spotted during the year. This is as large a number as has ever been found, and only the third time on record when over an even dozen have been spotted in a single year.

ISOLATING GERMS—A nasal washing is shown being collected by Dr. Leon T. Atlas of the National Institutes of Health common cold research program. Sterile skim milk is circulated through the nostrils and nasal pharynx of a volunteer who, a few days before, was inoculated with common cold virus.

The 12 new comets discovered (only two 1948 discoveries were the expected periodic return of old comets) are an outstanding record.

"More extensive use of photography in comet-hunting, use of wide-angle telescopes more suitable for this purpose and improved photographic emulsions all helped make this the second consecutive year that 14 of these visitors from space have been found," Dr. Whipple told Science Service.

Comet enthusiasts in the northern hemisphere have been unusually fortunate this year. One brilliant comet, found early in November, was easily visible with the naked eye throughout most of the United States, and several were visible with binoculars or small telescopes.

Fourteen comets in all were found during this past year. This is as many as those discovered in 1947 when a new, all-time record was set. This year, however, 12 of the comets were new and two marked the expected, periodic return to the vicinity of the sun of more familiar ones; last year only nine of the 14 were new finds and five were periodic returns.

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ASTRONOMY

Sun's "Hisses" Powerful

➤ SCIENTISTS receive radio broadcasts from "stations" hundreds of thousands of times more powerful than any broadcasting station here on earth.

Broadcasts from the sun reach the earth as "hisses," "swishes," and grinding noises, which interfere with radio reception at ultra-high frequencies. A broadcasting station of 100 million kilowatts would be needed to make these noises, originating from the sun, heard here on earth, estimates Prof. Jesse L. Greenstein of California Institute of Technology.

This is two million times greater than the most powerful radio station permitted here in the United States by the Federal Communications Commission. No wonder solar static interferes with FM, television and radar.

"The total energy transported in these radio signals is small compared to the energy in light or in cosmic rays," Prof. Greenstein stated at the meeting of the American Astronomical Society in New Haven, Conn. "But when we analyze the observations, we find that the energy is much greater than we might have expected."

A broadcasting station placed as far away as the nearest star would have to use a billion billion kilowatts to make us hear static such as reaches us from cosmic space, Prof. Greenstein estimates.

The use of radar in probing the heavens marks the first time in astronomy that instruments other than telescopes and other light-sensitive instruments have been used, the Caltech astronomer pointed out.

Intensity maps of the Milky Way show that the cosmic static comes mainly from the central part of the constellation of Sagittarius, the archer, where the center of the Milky Way galaxy is located, and from a small but bright region in the constellation of Cygnus, the swan.

The great distance to the stars weakens the signal so much that the average stars would have to emit 100 billion times as much radio waves as does the sun, if the stars are to account for the observed intensity. Therefore one theory suggests that this cosmic static originates in the outer atmosphere of a few extraordinary stars, which emit a large proportion of their energies as radio waves, of much longer wavelengths than light. Such stars, with strong electric and magnetic fields, might prove to be the rarest and strangest objects in the sky.

Ionized gas between the stars is the source of this cosmic noise, according to a second theory. Near hot stars, hydrogen gas (the space between the stars contains about 20 hydrogen atoms per cubic inch) is quite hot and electrified, whereas that far from such stars is neutral and cool. The hot regions appear as very faint gaseous nebulae in the Milky Way and could emit nearly enough radio waves to account for the observed intensity, Prof. Greenstein calculates.

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Infrared ray measurements, the first ever taken of the sun at an altitude of 35,000 feet, were made by the U. S. Navy recently, using an Air Force bomber.

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SCIENCE NEWS LETTER
Vol. 55 JANUARY 8, 1949 No. 2

52,200 copies of this issue printed

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change, please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566 and 360 N. Michigan Ave., Chicago, STAte 4439.

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ASTRONOMY

Camera Study of Meteors

Photographs of "shooting stars" are expected to provide much new information about the ionosphere, weather variations and the climate of the world.

➤ PICTURES of "shooting stars" have shown that the density of the atmosphere 45 miles or so above the earth increases in summer and decreases in winter. This new discovery was announced to the American Astronomical Society meeting in New Haven, Conn., by Dr. Fred L. Whipple of the Harvard College Observatory.

Meteors are high-velocity projectiles, but unlike V-2 rockets, they begin their flight in outer space and become trapped in our atmosphere, where they boil away high above the earth. The flash of light by which we know of their passing originates high in the atmosphere, in the same area now being reached by rockets.

More information about the densities and temperatures of this area 50-100 miles above the earth, and how they vary with the seasons, is thus vitally needed if we are to make maximum use of this "proving ground" for rockets and other high-velocity projectiles.

Density of the upper atmosphere is lowest in the northern hemisphere in late January and highest in early August, Dr. Whipple found. Thus, it is correlated with the average ground temperature, and changes with the seasons rather than with the sun.

Local variations of temperature have little or no effect on the atmosphere's density at this height, his studies indicated. Nor are storm fronts responsible for changes in density, as previously thought.

This Harvard photographic study of meteors, which has produced definite results after only a few months of observing, is sponsored by the Bureau of Ordnance of the Department of the Navy. The reduction of observations is being carried out by the M.I.T. Center of Analysis under the direction of Drs. Z. Kopal and L. Jacchia. The first photographs last August were taken simultaneously from two mobile caravans located just north of the Mexican border and near the city of Las Cruces, N. Mex. This is the first mobile photographic observatory to be used to study meteors.

These meteor photographs are also expected to provide new information about the nature and role of the ionosphere, upper layer of the earth's atmosphere which bounces radio waves back to the earth and enables us to hear distant radio signals, about weather variations and the climate of the world.

Separate stations and the use of two cameras make it possible to measure the height of meteor trails within a few feet and chart their paths more accurately. From this, scientists can determine the density of the atmosphere 50 to 75 miles up.

The assembling and most of the construction of the new type observatories was done by two young veterans, Harlan J. Smith and Richard E. McCrosky. They were assisted on the photographic work by Phillip Carroll, Jr. Mr. Smith was a Science Talent Search Winner in 1942. Three pairs of small photographic cameras equipped with rotating shutters operate at the two stations to photograph meteors simultaneously.

Two large cameras are being built specially to trap the faint, fleeting light of "shooting stars," those bits of cosmic dust that rush into our atmosphere and perish high above the earth.

These super-duper Schmidt-type cameras are expected to be completed and put into operation in about a year, Dr. Whipple announced.

Designed by Dr. James G. Baker, they will view a wide field and record the flight of meteors much fainter than those now observed.

The speeds of meteors and the fact that their appearance cannot be predicted makes them hard to photograph. Only the bright ones show up on most plates.

"These large cameras are expected to extend the magnitude range of photographic meteors approximately four magnitudes below the limits now set with conventional lenses, that is, not far from the average limit of visual observations," Dr. Whipple stated.

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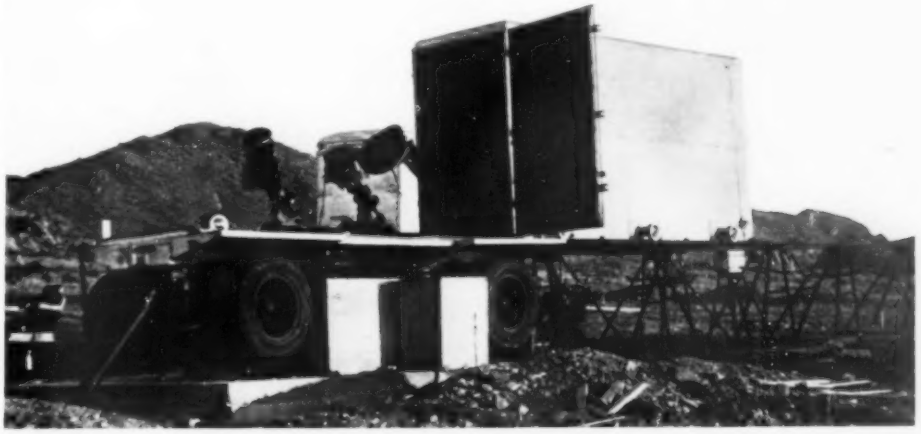
ASTRONOMY

Antenna 50 Feet Across To Pick Up Solar Noise

➤ AN ANTENNA 50 feet in diameter, to be used with a very sensitive radio receiver in detecting radio signals from either the sun or cosmic space, was described at the meeting of the American Astronomical Society in New Haven, Conn., by John P. Hagen of the Naval Research Laboratory.

This enormous instrument, to be ready to go into operation within a year or so, will be the largest precision instrument of its kind. With it the exact location and size of the area from which the cosmic static is originating may be determined more precisely.

Now in the process of being built, this enormous "dish" is being made of cast aluminum and its parabolic surface will be machined after casting. The whole will be mounted equatorially on a pier, with the training mechanism a converted gun mount. This has the necessary precisely machined gears and also the necessary strength to hold this antenna under ad-



METEOR PHOTOGRAPHY—The three cameras housed in this trailer, and a similar set 16 miles away, constitute Harvard's newest astronomical observatory and the first mobile observatories for photographing meteors. They are located in southern New Mexico near Las Cruces.

verse weather conditions.

Groups working in the relatively new field of radio astronomy, as listed by Mr. Hagen, include:

In the United States—the National Bureau of Standards, the Naval Research Laboratory and Cornell University.

In Canada—the National Research Council.

In England—the Operational Research Group of the Ministry of Supply, the Admiralty Signal Establishment, Cambridge University and the National Physical Laboratory.

In Australia—the Council for Scientific and Industrial Research.

In France—Ecole Normale Superiere at Paris, and the Institut de Astrophysique de Paris.

Research is also being conducted in Russia as occasional reports are received from that country.

Dr. Ralph E. Williamson of David Dunlap Observatory, University of Toronto, Canada, also took part in this symposium on micro-wave astronomy. His report dealt with radio emission from the sun.

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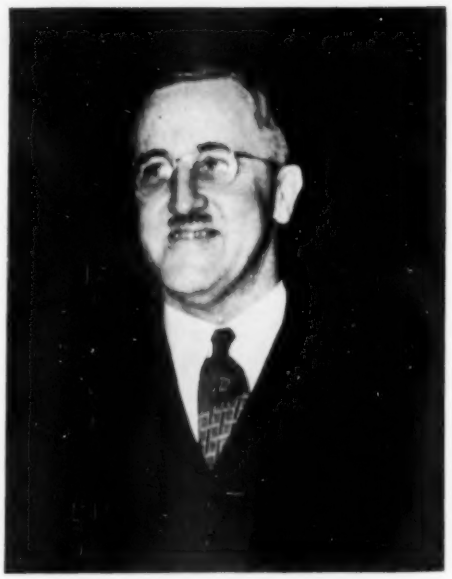

PRESIDENT-ELECT OF AAAS—Dr. Roger Adams, head of the department of chemistry at the University of Illinois, will become president in 1950 of the American Association for the Advancement of Science. He will succeed Dr. Elvin Stakman.

ASTRONOMY

Two-Star System Found

➤ THE third most massive system of double stars known has been found by Dr. Joseph A. Pearce of the Dominion Astrophysical Observatory, Victoria, British Columbia, Canada.

The two stars that revolve around each other are about 34 and 28 times as massive as the sun, Dr. Pearce reported to members of the American Astronomical Society meeting at Yale University in New Haven, Conn.

Extremely hot, these stars have surface temperatures of about 36,000 degrees Centigrade study of their found-out light shows. In intrinsic brightness, each is roughly 40,000 times as bright as the sun.

This double star, known to astronomers simply as HD215835, is nearly 7,000 light years from the earth, or over 41 million billion miles away. It is part of a cluster of stars.

The two stars race around each other at a speed of about 125 miles per second, whereas the earth goes around the sun at only 18 miles per second. Once each two days 2½ hours, they completely revolve around each other.

One reason for their high speed of revolution is that the two stars are so near each other, considering their vast sizes. Each has a diameter about nine times that of our sun—the larger measures 8,380,000 miles across. Yet the surfaces of these stars are within 8,000,000 miles of each other.

This double star system ought to show regular, periodic changes in light, Dr. Pearce pointed out. As one star revolves around the other, it should partially eclipse the one behind it and cut down the total light received from this two-star team.

To check this analysis Dr. Gerald Kron of Lick Observatory of the University of California is using a photoelectric cell on a telescope at Lick to record very accurately the brightness of HD215835.

A similar massive double star system also was reported by Dr. Sergei Gaposchkin of Harvard Observatory. He finds the star HD193611 to be a double of identical component stars, each with a mass 14 times that of the sun and about 12,000,000 miles in diameter. This star was also first observed by astronomers at the Dominion Astrophysical Observatory.

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ASTRONOMY

Radar Spots Fast Meteors

➤ FAST-MOVING meteors streaking through the earth's atmosphere are more likely than slow ones to be detected by low-frequency radar, astronomers and physicists of Harvard Observatory have found.

William Liller of Harvard Observatory reported at the American Astronomical Society meeting at Yale University in New Haven, Conn., on his statistical analysis of 160,000 meteor bursts recorded during the last part of 1946 and most of 1947 by J. A. Pierce, Cruft Laboratory, Harvard University, with a nondirectional, 3.5 megacycle transmitter. The study was made in conjunction with the Harvard photographic meteor program sponsored by the Bureau of Ordnance, Department of the Navy.

Fastest-moving meteors are known to be in the Perseid and Orionid showers, their velocities ranging about 38 and 42 miles per second, respectively. For every 10 meteors seen visually during the Orionid shower, Mr. Liller found 110 radar reflections. Slowest showers are the Geminids; for these only 35 meteors were detected by radar in an hour, as against 60 seen visually on the average.

When a pin-size bit of cosmic dust darts into the earth's atmosphere at a speed anywhere from 15 to 45 miles per second, friction with the air causes it to become very hot, so it leaves a trail of glowing gas particles which look like a "falling star."

This trail of gas is also ionized, and long after the visible light of the meteor has faded, the electrified trail of the meteor may reflect radio waves of certain frequencies. Early study of meteors by radar, especially in England, employed short-wave radio of such frequencies as 72.4 megacycles; the Harvard observations are with radio waves over 20 times as long.

These meteors are observed at altitudes near and above 60 miles, about the same height as the day-time "radio roof." This radio roof at certain times of the day prevented accurate measurements of the meteor frequencies by the Cruft Laboratory equipment, but did not prevent observation of parts of some of the best-known meteor showers, such as the Perseids in August, the Leonids in November, and the Geminids in December.

Visual observations long ago showed that fast-moving meteors leave bright trains in the sky more frequently than do the slower ones. It seems reasonable to assume that by the same mechanism these same meteors give stronger radio reflections.

Furthermore, the fast-moving meteors appear at greater heights where they can produce ionized tracks which endure longer and where the tracks are able to expand to the large size necessary to reflect radio waves of a frequency of 3.5 megacycles and still have an ion density large enough to reflect these waves.

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The most destructive animal to cattle, sheep, game animals, horses, swine and poultry in the United States is the *coyote*: more damage is done by the dog-like coyotes each year than by all other predatory animals put together.

NUCLEAR PHYSICS

Atomic Warfare Is Feared

The creators of the atomic bomb are the most fearful of such a war. They know that it would be mutually destructive and there is no known physical defense.

By WATSON DAVIS

➤ THE FEAR of war, waged by atomic bombs, blankets the world like a radioactive cloud, unseen but deadly. The atomic scientists, who gave birth to the atomic weapon under the stress of war, are among the world's most frightened men.

Communism's elite in the Kremlin may be as badly scared, but the scientists may have the psychological disadvantage of knowing more about what the atomic bombs can do and therefore fearing them more. Why are the atomic scientists worried?

They tell us these facts, repeatedly:

The atomic bomb is destructive beyond all previous measure. Physical means of defense are unknown. Other nations—Russia, that is—can rediscover secret processes. Atomic war would be mutual destruction. Another war would reintroduce the dark ages. The only defense is attack or counter-attack. Safety of distance does not operate because atomic destruction is concentrated in small packages. Surprise attack may be decisive, if not conclusive. This contributes to the likelihood of war. A preventive war might be waged against an expected aggressor. A nation might even launch a preventive war to anticipate a preventive war. Population, army divisions, naval vessels and industrial resources won't necessarily count in making a nation safe from atomic attack. A country inferior in conventional war potential might make itself atomically superior.

Only international control of atomic energy can neutralize the use of atomic weapons. But the United Nations is deadlocked on atomic energy. The fundamental reason for this is:

Adequate control requires the surrender of some degree of national sovereignty. Put more bluntly, you wouldn't pledge complete loyalty to the USA, right or wrong, and neither would the Soviet citizen to his country.

The Soviet Union won't stand for inspections of its territory by United Nations officials. This is a symptom of the complete suspicion of motives and actions in dealings between the West and East.

Solve the problems of Berlin, Germany, Austria, Trieste, China, Korea, Japan and all other hot borders, and atomic energy would still be an area of cold if not actual war.

Along with control of atomic energy, there must be disarmament of conventional weapons and prohibition of biological (germ) weapons.

War and use of atomic weapons can be avoided only by the development of world authority with adequate power to enforce the peace. That means world government, so far as war and peace are concerned—a world police force, and all people represented in a legislative, executive and judicial system to enforce the peace.

Despite the mastering influence of atomic energy, most of the world's peoples are concerned with getting enough food, clothing and shelter. For peace these needs must be met.

If the United States led a campaign for world government, it might result in many other nations pooling their sovereignties, although the Soviet Union and its satellites probably would not. All powers would have to join to prevent war.

This is the way some of our atomic scientists are thinking (Association of Scientists for Atomic Education). This is a summary of a working memorandum I have seen.

The world is told that "a technological revolution has occurred which makes intolerable the continued division of the world among sovereign powers." Is its choice one world or none?

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MOUNTAIN LION ADOPTS TIGER CUBS—Taken from their mother because of "killing kindness" which had destroyed other tiger cubs, these youngsters are being raised by a Puma at the National Zoological Park in Washington. Dr. William Mann, director of the zoo, stated that this strange adoption is very rare but has proved successful, although the adopted mother is puzzled by the stripes on her charges.

BOTANY

New Variety of Holly Has Just Been Patented

➤ THE YULETIDE week was appropriately celebrated by the U. S. Patent Office, in the issuance of plant patent 817, on a new variety of holly, to John F. Styer of Concordville, Pa. His plant is a variant from the Japanese holly, already cultivated in this country though not to the same extent as the European and native American species. The bush is described as having a horizontal branching habit, and smaller leaves than usual.

A second plant patent No. 816 was granted to Charles H. Hamburg of Whittier, Calif., on a late-maturing avocado, that bears medium-sized, thin-skinned fruits, ripening most of them in June and July, after the main crop of similar avocados has matured. The new variety originated as a chance seedling from a Guatemalan tree.

Science News Letter, January 8, 1949

AERONAUTICS

U. S. Improves British High-Powered Jet Engine

➤ AN AMERICAN-improved, British-designed jet engine, which recently successfully completed its official 150-hour military test, is now in production and is said to deliver a static thrust of 5,000 pounds, the highest yet announced for any American jet engine.

At 650 miles an hour or more, 5,000 pounds of thrust is equivalent to almost 9,000 horsepower, Pratt and Whitney engineers in East Hartford, Conn. stated in revealing the new engine. It will be known as the JT-6B Turbo-Wasp, and will be used first in the Grumman F9F-2 Panther, a Navy carrier-based fighter with an announced speed of over 600 miles an hour.

This Turbo-Wasp is a pure jet propulsion power plant, with a single-stage, double-entry centrifugal compressor, nine combustion chambers and a single-stage axial flow gas turbine. The basic design of the engine was the work of Rolls-Royce, in England. Pratt and Whitney acquired the United States manufacturing and sales rights to this British Nene in May, 1947, and has since made extensive changes in accessory case design to meet U. S. Navy requirements.

Americanization of the engine has also included the incorporation of metals, parts and accessories from domestic sources. Magnesium for example, is used to replace the heavier aluminum for some parts. The complete engine is roughly eight feet long and four feet in overall diameter. It can be operated either with kerosene or with gasoline.

Science News Letter, January 8, 1949

AERONAUTICS

Cross-Wind Landing Gear For Planes To Be Promoted

➤ THE USE of landing gear for airplanes, the cross-wind type which will permit safe landings on single runways regardless of the direction of the wind, is to be promoted during the coming year, the U. S. Civil Aeronautics Administration revealed in announcing the appointment of John H. Geisse to take charge of the program.

This so-called cross-wind landing gear, which has landing wheels on casters instead of fixed in a single position lengthwise with the plane, is to be promoted primarily as an economy measure in airport construction. Airports for all-weather use today have runways extending in several directions so that planes can land headed directly into the wind, or at an angle not over 22.5 degrees from directly into the wind. When planes are equipped with the cross-wind gear, one landing strip only will be required in light-traffic ports, and parallel strips can be used in others.

The program will involve working with aircraft manufacturers on further refinements of the cross-wind gear developed during the past year or two, and their installation on new and old planes. It will involve also work with operators of private and commercial planes on conversion of their craft to cross-wind gear, and work with communities planning to build or improve airports.

The use of cross-wind landing gear is not new because it was used on some planes 25 years ago but later was discarded in favor of undercarriages having two fixed wheels ahead of the center of gravity and a castered steerable tail-skid or V-wheel. The present cross-wind gears were not designed by the government but by individual airplane manufacturers at the suggestion of the CAA. This government aviation office has tested the various types developed and has issued a report covering several of them.

Science News Letter, January 8, 1947

ENGINEERING

Roofing Paper Protects Basementless House

➤ ROOFING paper, covering the soil under a basementless house, helps keep the moisture low in the crawl-space between floor and earth and decreases danger of timber rotting and iron rusting. It lessens the need for crawl-space ventilation, thus making it easier to keep the floor warm.

This is the finding of the U. S. Department of Agriculture after extended observations. Heavy roofing paper is recommended by it. With properly covered soil, the crawl space was often found dry enough to be used for storing garden tools, lawn mowers and lumber.

"Sweating" or condensation of moisture has not been found in a single case where this precaution was taken, Dr. J. D. Diller, a Department forest pathologist, stated. This means protection not only for the lumber in the structure but against rusting of steel, deterioration of insulating materials, buckling of floors, and the short-circuiting of electric wiring that sometimes occurs in moist spaces.

Science News Letter, January 8, 1947

INVENTION

Pilots Forced to Jump Are Protected by New Device

➤ PROTECTION for aviators forced to jump from high-speed planes in a hurry is provided by an English inventor, James Martin of Higher Denham. Around the pilot's seat, but out of the way in ordinary flight, are a series of quickly engageable plates to cover his body and face against the sudden buffeting of the outside air when he is tossed out of the falling or spinning plane. This invention is covered by patent 2,457,252.

Science News Letter, January 8, 1949

IN SCIENCE

AERONAUTICS

Radar Housing on Plane Wing Tips Satisfactory

➤ A PLACE to carry radar equipment on airplanes without using valuable cargo space has been discovered. It is at wing-tips, in bomb-like casing similar to the tanks used on jet planes to carry extra fuel.

These experimental wing-tip radio-radar domes have been successfully tested in Hagerstown, Md., by Fairchild Aircraft on a Fairchild C-119, the improved version of the well-known box-car Packet. They were developed for the U. S. Air Force at the request of the Air Materiel Command at Wright Field.

Dubbed radomes, they are made of plastic and built into special wing tip sections adaptable for Fairchild planes of the present and future. The radar equipment, mounted in the left wing-tip dome, weighs about 200 pounds. Standard radio equipment which was moved to the right wing to balance the ship, also eliminates two antennae usually mounted on the plane's exterior.

Science News Letter, January 8, 1949

BOTANY-CHEMISTRY

Wild Onion of India Good As Starch Substitute

➤ A WILD onion in India is passing from a useless weed to a useful plant. It has just been found at the Jiwaji Industrial Research Laboratories in Gwalior, India, that it can yield a white powder suitable to replace starch for sizing and finish in textiles.

The discovery was made in research to obtain a cheap substitute for grain starch because all grain grown in India is badly needed for food, explained Dr. R. R. Seth of the Laboratory. The desire was to find a starch substitute from a plant which seemed to have no food value and no other known uses. This Indian wild onion has some value in medicine, but it is expected that a commercial process will be found to recover the medical ingredients and still obtain the starch substitute.

The botanical name of the plant from which the sizing material is obtained is *Urginea indica*, but it is known locally as Kolikanda. Although its common English name is wild onion, the plant is actually more nearly related to the red squill, *Urginea maritima*, that grows in the Mediterranean region and has long been used as a rat poison. It has also been used, oddly enough, in the preparation of a standard cough remedy, syrup of squill.

Science News Letter, January 8, 1949

E FIELDS

METEOROLOGY

New International Weather Code Put into Effect

➤ WEATHERMEN all over the world gave a New Year's present to each other, in the form of a new code for the swift and compact transmission of information on which daily weather maps are drawn up and several-times-daily forecasts made. It was put into use for the first time Jan. 1, 1949.

When the teletype machine in a weather office starts to stutter out on its printed tape something like this: 40350 83220 12716 and so on, it didn't mean they had tuned in on any of the "bowl" football games. Those numbers, and the order in which they occur, told a meteorologist's experienced eye where the message came from, when the observations were made, whether there was rain or snow or sunshine, how hard the wind was blowing and from what direction, and all the other data which appeared presently on the weather map as black dots for rain, stars for snow, swishy lines for cloud types, and all the other hieroglyphics that make weather-map reading a fascinating game nowadays.

Cooperating meteorologists will be sending and receiving these code messages in most of the European countries, including former enemy lands, as well as the more advanced Asiatic countries, and all the Latin-American, South African and other Southern Hemisphere regions.

Science News Letter, January 8, 1949

HORTICULTURE

Medals Awarded to New Varieties of Vegetables

➤ MEDALS are being handed out to squash, lima beans, lettuce, radishes, cauliflower and sweetcorn. These new vegetables, winners of the All-America Selections awards for 1949, may be grown in your own garden this spring.

Caserta summer squash, light yellow with irregular green stripes, wins the first Gold Medal given for vegetables in over a decade. Just a few plants will supply a family with squash over a long season. Developed by Dr. Lawrence C. Curtis of the University of Connecticut experiment station, it is of the summer bush type.

The coveted Silver Medal goes to the Triumph bush lima bean, which produces the finest quality butter beans available throughout the whole country. Especially tasteful fresh from the garden, Triumph is great for canning and freezing and it is valuable for dry or shelled beans. Drs. Roy Magruder and Robert E. Wester, U. S. Bureau of Plant Industry, are responsible for this achievement.

Two heat-resisting head lettuce varieties, both developed by Prof. M. T. Lewis of Penn State College, receive Bronze Medals. Premier Great Lakes lettuce is resistant to tip-burn. Trials produced over 90% of choice marketable heads in summer, an outstanding record. This lettuce matures about a week earlier than its co-winner, Pennlake lettuce. Strongly resistant to heat and tip-burn Pennlake lettuce makes a smaller head that fits conveniently into the refrigerator.

Cherry Belle radish, also a Bronze Medal winner, grows into round globes of the brightest red. It is crisp and firm at all stages.

Easy to grow, Ideal Snowball cauliflower produces beautiful big heads or curds which hold for days without ricing or granulation. Flagship hybrid sweetcorn provides bigger ears on stronger stalks, even under adverse weather conditions. Both of these receive Honorable Mention.

Seeds of all these vegetables, destined to soon replace many of the older favorites, may be obtained conveniently through any reliable seed house. They should be ordered early, however, if you want to be sure of a supply this first season.

Science News Letter, January 8, 1949

AERONAUTICS

Polarizing Sun Glasses Not Approved for Pilots

➤ POLARIZING sun glasses, worn by aircraft pilots in flight, may cause spots and streaks in front of their eyes, and are regarded as hazardous and distracting by officials of the U. S. Civil Aeronautics Administration. Their use is not recommended.

Glasses which polarize light cause the appearance of numerous dark areas in certain types of windshields, this government agency states in a report. Sometimes these resemble large-screen mesh; in other cases they form parallel light and dark streaks. Visibility is greatly decreased.

The reason for the phenomena is that "strain patterns" in the original material from which the windshield was made become visible when light is polarized. This fact has long been known, and has been applied in various industrial processes. However, the appearance of such patterns in a windshield, where they are normally invisible, can be a serious flight hazard.

The report, copies of which are available free from the Civil Aeronautics Administration in Washington, was prepared in Oklahoma City in the agency's Medical Research laboratory, by John J. Swearingen and George R. Johnson. Its title is STRAIN PATTERNS IN AIRCRAFT SAFETY WINDSHIELDS AND VISIBILITY THROUGH POLAROID SUN GLASSES.

Science News Letter, January 8, 1949

ORNITHOLOGY

Bird Migration Patterns Still Puzzling Watchers

➤ BIRDS are still proving puzzles to men, particularly in their ability to make long and seemingly unguided flights between their summer and winter ranges. In SCIENCE (Dec. 24), several observers offer their data and suggest explanations.

A recently propounded theory, that birds making east-west flights over oceans are merely following ancient routes that were shorter before continental drift separated the land masses, is examined and rejected by Dean Amadon of the American Museum of Natural History in New York. He declares that most paleontologists, students of ancient life, do not accept the theory of continental drift, and he also argues that the primitive birds that existed when this drift is supposed to have started can hardly be imagined as having anything resembling the highly developed migration pattern of modern birds.

Bird migration patterns are by no means fixed and changeless, states James Hodges of the Davenport, Iowa, Public Museum. He cites definitely established cases of band-identified birds shifting from one flyway to another in the central valley of this continent, although these flyways are separated by scores or hundreds of miles.

An English observer, C. Suffern of Fareham, Hants, calls attention to the tendency of birds to follow shorelines or island stepping-stones instead of going in the straight lines imagined in the old phrase, "as the crow flies." He mentions several such island guide-chains followed by birds in flight across the Mediterranean, some of which were continuous land bridges in relatively recent geologic time.

Bird migration routes across oceans may be determined, at least in part, by prevailing wind patterns at migration time, suggests H. Landsberg of the U. S. Research and Development Board, Washington, D. C. Some of the most puzzling of transatlantic bird flights fit rather neatly into the patterns of seasonal weather maps, he declares.

Another migration-guide theory, that birds somehow respond to the magnetic field of the earth, has been re-examined, with negative results, by Donald A. Gordon, University of Illinois psychologist. He attached light but powerful magnets to the wings of one lot of Army homing pigeons, slugs of similar unmagnetized metals to the wings of a similar group, and used a third group without anything attached as controls. All the birds got home, though according to the theory the birds with rapidly oscillating magnets on their wings should have become confused and got lost. The experimenter feels that further research, with still more careful methods and analysis of results, is needed before a final verdict can be turned in.

Science News Letter, January 8, 1949

GENERAL SCIENCE

Young Scientists Make Good

Researches ranging from birds to stars to atoms are being performed by winners of the first seven Science Talent Searches for Westinghouse Science Scholarships.

By MARGARET E. PATTERSON

➤ A BACKYARD, an attic or even a kitchen sink in your neighborhood may help launch the future fight on disease or the solving of mysteries of the still little-known atom. It is in such humble "laboratories" that teen-age youngsters are today getting their start in science. For some of them fame is only a few months away.

Spotlighted in their senior years in high school, 280 young scientists are already combining youth and talent to make good in many different fields of science.

Mysteries of nature ranging from birds to stars to atoms are already under attack in the researches of the winners of the first seven Science Talent Searches for Westinghouse Science Scholarships. Each year beginning in 1942, 40 top high school scientists have been picked as winners in the search conducted by Science Clubs of America, administered by Science Service. Today, most of this group is still in college, training for careers in science. But this has not kept them from making mature research achievements.

Future Scientists

A glance at the work some of these young scientists, 15 to 24 years old, have done during the past summer supports the verdict of Talent Search judges that these young men and women will contribute to the future.

Martin Karplus, amateur ornithologist and physiologist-to-be, observed bird navigation by foot and by air under 23-hour daylight conditions in Point Barrow, Alaska, for the Arctic Research Laboratory.

Five young astronomers practiced their chosen profession in widely separated areas. Mrs. Constance Sawyer Warwick, Joyce Marrison and Gordon Newkirk, Jr., collaborated on problems of the sky, using the telescopes and cameras of Harvard's summer station in Massachusetts. Harlan Smith charted meteors at night from a field station in New Mexico for the Navy. Elizabeth Roemer continued her daily sun-spot observations in California and reported them regularly to the National Bureau of Standards.

Future geologists chose various ways of learning more about their subject. Barclay Kamb went on another mountain climbing expedition in the far west, earning his expenses as counsellor to a group of adventurous youngsters. Jerome Eisenberg, lately elected editor of a professional geology magazine, roamed south to Cuba and north to Canada in search of likely material for future articles. Paul Cloke returned to his summer job as a geological field assistant with the U. S. Geological Survey in Maine.

Jules Kernen, biochemistry student, went back to Washington University for his fifth summer as a research assistant in the botany department. Paleobotanists there are using the fossil plant specimens he collected, cleaned, carved, chipped and labelled.

Future M. D.'s found work in hospitals and laboratories. Cecilia Self was a biology aide in California while Gary Felsenfeld was a laboratory assistant in a New York hospital. Ruth Reichart and Alice Dale, more advanced in their medical studies were able to fill positions as research assistants in experimental surgery in New York City and Nashville.

Professional Stature

Robert Hall, anthropologist of several years' training, jeeped over the territory soon to be flooded by the Missouri River. For the second summer under the auspices of the Smithsonian Institution he searched and dug for archaeological treasures that should be saved.

David Shappirio collected wasps in Washington, D. C., and polished off some more of those scholarly studies about the habits of rare wasps that are making him an authority in this field at 18. Saul Kravetz is a mathematics major who speaks several languages fluently. He translated mathematics texts from German and Russian into English under contract to a publishing house.

Physicist-in-training David Cudaback delved into the mysteries of Geiger counters, cosmic ray counting devices and cyclotrons for his third summer in the Radiation Laboratories at Berkeley, Calif. Raymond Schiff, research assistant in the Westinghouse Research Laboratories, lectured through Texas, explaining nuclear physics to lay audiences. He did such stunts as mounting a Van de Graaff generator and taking a charge that made his hair stand on end.

All these young scientists have now returned to their college classes. They are only a few of the 280 who have been discovered through the seven years of the Science Talent Search. The Eighth Search is already underway to select 40 more from the senior classes of the country's high schools.

The 16,000 boys and girls who entered the competition this year were busy with practical experience in science during their vacations and are now back at their high school studies. They have reported on the results of their investigations and experiments in a 1,000-word essay on "My Scientific Project," one of the requirements of the competition which ended Dec. 27, 1948.

In 18 states where State Science Talent Searches have been set up to run concurrently with the national competition, the fortunate entrants will have a double chance of placing in the national or state contest and are thus assured of more opportunity for further school work.

Scholarship Awards

From the thousands who competed this fall one boy or girl will be selected to receive a Westinghouse Grand Science Scholarship of $2,800. A similar award of $2,000 will go to the runner-up. Other contestants will receive scholarships ranging from $100 to $400. All scholarships are made available through the Westinghouse Educational Foundation.

Science Service and the Westinghouse Electric Corporation join in the administration of the annual Science Talent Search. Through it they are helping to alleviate the manpower shortage in science—one of the most critical shortages that faces the

RESEARCH ASTRONOMER—Mrs. Constance Sawyer Warwick of Lewiston, Me., adjusts a Schmidt telescope of the Harvard College Observatory.

PRACTICAL EXPERIENCE—Youthful Roy Willcockson of Tulsa, Okla., explains an oil field seismogram which has just been recorded in a Wyoming field of the Stanolind Oil and Gas Company.

world today. Industries, research laboratories and universities lack sufficient trained personnel for important research work. Funds are available for new plants and laboratories but the bottleneck is lack of people to staff them.

Finding and assisting promising, talented boys and girls who show research ability in science by the time they are high school seniors has been the concern of the Science Talent Search for the past seven years. It is now possible to begin to see the results of the experiment in spotting those young scientists who will be the research leaders of tomorrow.

The question is often asked: "Do the winners of the Science Talent Search really become scientists?" The answer is a definite yes. All have attended college and in spite of wartime delays in schooling there are now 69 men and 32 women who hold undergraduate degrees; six men and four women have their masters' degrees and one woman has completed her Ph.D. Three men and one woman are M.D.'s. Last year the winners attended 74 different colleges and universities in 23 states and abroad.

Full-time Workers

By far the greater number are still in school, but a few are now sufficiently advanced to hold full-time positions.

Down in Oak Ridge, Tenn., Judith Cassidy is a research assistant to a physicist in the National Laboratory of the Atomic Energy Commission. Catherine Ens does statistical work for Monsanto and Carol Pike, chemical engineer, is employed by Hydrocarbon Research, Inc. All spectrographic analysis at the Research Laboratories of the Sinclair Refining Co. is in the hands of Jean Ross, physical chemist.

Some of the women who have been winners are able to combine homemaking with their careers. Mrs. Gloria Lauer Grace, Ph.D., taught psychology at Barnard College; Mrs. Elizabeth Foster Tilton, M.S., is a technician in Chicago Lying-In Hospital of Chicago University, where she helps in a study of the metabolism of hormones. Mrs. Ruth Miles Briehl is a full-time medical technician in Dubuque, Iowa. Of the eight women who are married most have scientist husbands and are continuing their careers independently or as partners in their husbands' work. Mrs. Virginia March Kline has taken a temporary leave of absence from the McArdle Cancer Research Laboratory at the University of Wisconsin where she was a chemist to devote full time to her homemaking and daughter, but she follows the work closely as her husband is a chemist there, too. There is a high percentage of scientist wives among the 24 married men. They have a total of seven children.

Richard Hoover, M.S., chemical engineer, is the assistant supervisor of a new plant for synthetic caffeine manufacture for Monsanto in St. Louis.

Of those who are advanced beyond their first degree many are carrying heavy schedules of teaching and research work to assist in the teacher shortage. Wolf Karo, organic chemist at Cornell, and Edward Kosower, in the same field at the University of California at Los Angeles, earn their way with their teaching of undergraduates while they work on their advanced degrees. John Michener at Carnegie Tech teaches electronics, carries on a research project in the physics of metals for the Navy and at the same time finds time to complete the work for his Doctor of Science degree.

Fellowship Assistance

Previous winners have been fortunate in obtaining further scholarship and fellowship assistance to continue their training. Almost all who need it get such help. Some have been honored by national fellowships of generous proportions. Evelyn Pease, biochemist at the University of Michigan, and Rodman Jenkins, chemical engineer at Cal. Tech, are using pre-doctoral fellowships from the National Institutes of Health. Robert Kraichnan and Roy Mottleson, physicists, study at MIT under Atomic Energy Commission Fellowships and Clifford Swartz, physicist, also has one of these for his Ph.D. at the University of Rochester. Fellowships have been awarded to mathematician Halsey Royden at Stanford and Wayland Noland, organic chemist at Harvard.

Though none have been out of high school more than seven years, they are already becoming well known at science meetings where they report on their findings. A number have published the results of their research and at least two are well along on books they are writing about their work.

Complete details of the Eighth Annual Science Talent Search may be obtained by writing to Science Clubs of America, 1719 N St. N. W., Washington 6, D. C.

Science News Letter, January 8, 1949

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ENGINEERING-MEDICINE

African Dams Harm Health

➤ EFFORTS to better the lot of the peoples of Africa by building dams and reservoirs are resulting indirectly in vast harm to their health through failure to prevent the spread of disease-carrying snails, states Wendell Phillips, leader of the University of California African Expedition. Mr. Phillips is back in this country for a two-month stay, to prepare his report to President Robert G. Sproul of the University, on the first 14 months of the expedition's operations.

"Studies on the distribution of the snails that are carriers of the blood-fluke (Schistosoma) indicate that conditions for the breeding of these animals are becoming more favorable all over the territory covered, with the development of dams and reservoirs without sufficient snail control," Mr. Phillips explained.

"In Tanganyika it is estimated that new reservoirs become infested with snails, and infected with the parasitic flukes, within 12 to 18 months after installation. The rapid spread of the infection can be explained by troop movements, by the presence of camps for war prisoners and refugees, and, especially in the Congo, by the migration of native labor."

Another thing that is doing vast harm in Africa, he declared, is the practically universal grass- and bush-burning practice of the natives.

"They are the curse of Africa," the expedition leader stated. "The burning of the grass destroys the leaves of the trees, and also exposes the soil to desiccation for at least an additional month every year.

"Moreover, the fire destroys the thick bush which is unfavorable to tsetse flies, and gives rise to low secondary undergrowth which is extremely favorable to the flies."

The expedition is maintaining three parties in the field. One is working in Madagascar, under the direction of Dr. Harry Hoogstraal. This party is collecting mammals, and also carrying out a medical research program for the U. S. Navy. A second party led by the veteran Prof. Robert Broom and Dr. Basil Cooke, has had conspicuous success in its search for the fossils of ancient man and man-like apes. The third party has been operating in southwestern Africa, led by Dr. C. Koch, well-known Australian entomologist, and Dr. G. van Son, entomologist at the Transvaal Museum in Pretoria.

One outstanding cooperator with the expedition is himself a native of Africa: Prof. M. Mitwally of Farouk University in Cairo. He has recently finished a three-month trek, from Nairobi across Uganda, into Belgian Congo, thence into the Union of South Africa and Mozambique.

While on this long journey he had opportunity to study two native peoples who quite literally represent "the long and the short of it." Fairly near neighbors, in the general region of Victoria Falls, are the four-foot pygmies and the Watusi tribe, whose men average more than six feet in height.

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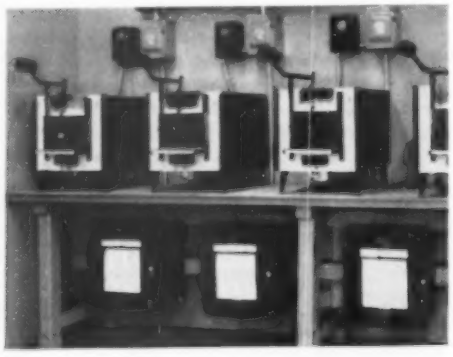

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PLANT PHYSIOLOGY

Caesarian Operations Save Plant Embryos

➤ CAESARIAN operations are saving scientifically valuable hybrid plant embryos at the Smith College Genetics Experiment Station in Northampton, Mass.

Certain hybrid plants being studied by Dr. Albert F. Blakeslee and associates sometimes fail to produce seeds that will grow. Microscopic examination of the developing seed capsules showed that supporting plant tissues that normally supply nourishment to the growing plant embryos were instead developing abnormally, into what Dr. Blakeslee terms "plant ovular tumors", cutting off supplies to the young seeds and thus causing them to perish.

By careful surgical removal of the immature embryos, and culturing them as "incubator babies" on synthetic nutrient mixtures, they were kept alive and growing until they were able to strike root and take up normal existence on being transplanted into soil.

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ASTRONOMY

Distance from Earth to Sun Is Again Measured

➤ ANOTHER measurement of the distance from the earth to the sun, important as the astronomical unit by which the scale of the sun's family of planets is established, has been completed by Dr. Dirk Brouwer, director of Yale University Observatory in New Haven, Conn.

The mean distance to the sun is 92,960,000 miles, with a probable error of 35,000 miles either way, Dr. Brouwer reported to members of the American Astronomical Society meeting in New Haven. This result compares favorably with the currently used figure of 93,000,000 miles (with an uncertainty of about 11,000 miles), announced a few years ago by the Astronomer Royal of England, Sir Harold Spencer Jones.

A total of 5,100 observations during the years 1932 to 1942 of the exact time when the moon passes between us and a star, or occults it, were used for Dr. Brouwer's study. Although this method has been employed before, the material used in the study was large in quantity, and the analysis more detailed than in previous work of this kind.

Sir Harold based his calculations upon observations of the minor planet, Eros, made all over the world in 1930-31, when Eros made a close approach to the earth. Dr. Brouwer's method would have the accuracy of the Eros results only if some 25,000 occultations had been included in his analysis, instead of 5,100.

This independent method of measuring the distance to the sun has considerable value in confirming other measures, even if they are of higher accuracy. The attraction of the sun on the earth and the moon affects the motion of the moon around the earth in a very complicated way.

A periodic oscillation is the one used in Dr. Brouwer's study. Due to its presence in the moon's motion, the moon is about 1/15 of the moon's diameter behind its average motion at the time of first quarter and a similar amount ahead at the time of last quarter. At both new moon and full moon, our satellite's position among the stars is not affected by this particular oscillation.

The amplitude of the effect of the parallactic inequality is inversely proportional to the mean distance of the sun from the earth, so that if the amplitude of the oscillation can be found from observation, the sun's distance from the earth can be obtained.

Science News Letter, January 8, 1949

MEDICINE

Disease Prevention Urged

The Hoover report suggests cutting the costs of medical care and hospitalization by putting greater stress on prevention of sickness and disability.

➤ A FRESH slant on the medical care problem appears in the Hoover Commission report on federal medical services.

Cut the costs of medical care and the needs for hospitalization by spending more money and effort on preventing sickness and disability, is the gist of one of the commission's recommendations.

As an example of what can be saved in this way, the commission points out that diphtheria might have cost the nation $30,000,000 in one year, 1947, instead of the $600,000 it actually cost. The saving, with a saving also of 50,000 lives, is figured on the basis of what the disease would have cost if the mortality of the year 1900 had prevailed.

"Most alarming" is the outlook for future costs of medical care and the needs for hospitalization, if medical care is considered in terms of its organization as it exists today, the commission finds.

The costs for hospital care could be reduced directly by another method, the commission suggests. This is to provide for more patients to be cared for at the doctor's office or in clinics, what is termed "ambulatory care". But at present, the commission finds, the government is apparently committed to a reverse policy with huge sums of money being appropriated to build new hospitals.

The federal government is already giving medical care of varying degree to about one-sixth of the nation's population. Included in the approximately 24,000,000 Americans now getting government medical care are members of the armed forces and their dependents, veterans with and without service connected disabilities and merchant seamen who are beneficiaries of the U. S. Public Health Service Marine Hospital System.

The quality of this government medical care is "excellent" in some places, and not so good in others, the commission's task force found in its almost year-long study. The lower quality of care, where it exists, stems from the lack of overall central planning. Small Army and Navy hospitals, unable because of their small size and staffs to give the best medical care, exist almost literally by the side of large government hospitals with empty beds. These large hospitals are well staffed and equipped and give excellent care. Members of the armed forces would fare better if cared for in these larger institutions.

Medical manpower is now so short that a draft of doctors may be necessary to fill the Army's estimated needs. But well over half the armed forces' medical manpower in the New Orleans area alone could be saved by unified hospital planning, and better care could be given military personnel, the commission states.

There might be enough nurses to go around, too, if government hospitals were under a unified plan. At present civilian hospitals are often forced to close whole sections because they cannot get enough nurses to care for the patients. At the same time, empty beds are found in many government hospitals which are bidding against the needy civilian hospitals for nurses.

National defense demands the best utilization of medical manpower, the commission points out.

"Where atomic warfare is a potential threat it is not feasible to take medical practitioners from their home communities. To do so would imperil civilian defense."

Best utilization of medical manpower would come, it is stated, from a full integration of the federal hospital system with non-federal hospitals.

Science News Letter, January 8, 1949

ASTRONOMY

Division in Universities Of Astronomy Field Urged

➤ UNIVERSITIES offering graduate work in astronomy should get together and more or less divide the field between them, Dr. Otto Struve of Yerkes and McDonald Observatories of the Universities of Chicago and Texas advocated at the teachers' symposium of the American Astronomical Society meeting in New Haven, Conn. Dr. Struve is president of the Society.

Duplication would be eliminated and greater diversity of courses made possible by an arrangement whereby some graduate universities would specialize more in theoretical research, others would continue to train students to be experimentalists, Dr. Struve pointed out.

It is almost impossible in one institution to say that one student should take a certain course of lectures from which another is excused in favor of, for example, putting together an amplifier for a photo-electric photometer, he explained.

At European universities, formal knowledge is stressed to a much greater extent than it is in the United States. Hence a student from Europe is usually far better equipped with a knowledge of advanced mathematics and advanced physics than are American students, Dr. Struve stated. This is compensated for, however, by the fact that our students possess a greater manual dexterity and are therefore better equipped to do any kind of work that requires the handling, building and adjusting of instruments.

The average American student, on the whole, has more initiative than students who come from Europe, Dr. Struve remarked. This results in a greater desire to conduct research work than is customary among graduate students in Europe.

Science News Letter, January 8, 1949

ENTOMOLOGY

Honey of an Idea: Bees Pay for Club

➤ IT'S A, Bees and C's for students at Racine's William Horlick High School in Racine, Wis.

The bees, a whole hive of them, are both resident and paying members of the school's Science Clubs of America group. The bee colony is outside the clubroom window. And honey is sold to pay for club projects.

Through glass panels of the hive, young scientists study the ways of bees safely, while watching the work that pays club expenses.

Science News Letter, January 8, 1949

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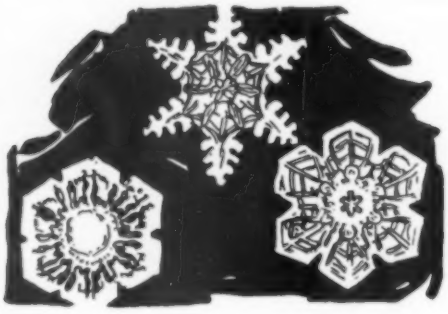
METEOROLOGY

NATURE RAMBLINGS

by Frank Thone



➤ SNOW crystal study is a fascinating pastime—if you can endure a little cold. All you need is a piece of dark cloth—the sleeve of your overcoat will do—and a good hand lens. You must also have the ability to hold your breath while examining these tiny fallen stars, for if you breathe on them they vanish, like fairy gifts when the magic spell is broken.

If you want to carry your study indoors, and even pursue it next summer, you can easily prepare the artificial "fossil impressions" invented a few years ago by Dr. Vincent Schaefer of the General Electric Company. You put a dab of a soft, self-setting plastic, known as "Formvar," which you can purchase at any paint store, on a clean, clear piece of glass, and transfer snow crystals onto it with the thin-shaved edge of a bit of wood. The crystal will vanish, but will leave its delicate, six-pointed print behind it. When the plastic hardens, you will have a permanent specimen.

Study of such prints, as well as of actual photographs of thousands of snow crystals, indicates that although they are always six-pointed they are never exact duplicates. No print or photograph precisely like another one has ever been found. It is somewhat dizzying to reflect that in the uncountable, unimaginable trillions of snow crystals that have fallen from the winter skies since the world began there have never been any duplicates. Yet considering the immense number of water molecules that go to make up even the smallest of snow crystals, and the infinite variability of the basic hexagonal pattern, it is quite definitely possible.

Differences in size of snow crystals, which is correlated with differences in the intricacy of their patterns, are believed to be correlated with the heights, and hence the temperatures, of their formation. The smallest crystals, which have a doric simplicity of outline, fall from the highest clouds. The largest and laciest crystals are the product of lower altitudes, where there is plenty of moisture but temperatures not very far below the ordinary freezing temperatures as we know them at ground level. Graceful intermediate patterns, neither very severe nor yet over-elaborate, come from the middle heights.

Of course, in the wettest type of snowstorm, where rain alternates with the fall of thick sticky flakes, the crystals are all matted together and their clean outlines are lost. Snow of this type is difficult to examine—and hardly worth the trouble of examining.

Science News Letter, January 8, 1949

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MEDICINE

Stomach Rupture Danger

➤ THE STOMACH may burst after bicarbonate of soda has been taken under certain conditions.

A warning to physicians to be alert to this fortunately rare catastrophe is issued by Dr. D. Gordon Burket of Altoona, Pa., in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Jan. 1).

The stomach rupture apparently comes through a rather abrupt release of carbon dioxide gas caused by the action of acid on the soda. The acid may be the normal hydrochloric acid of the stomach. It may be acid from fermentation in the stomach. Or, as in Dr. Burket's patient, it may be the citric acid of citrate of magnesia taken as a cathartic. The stomach is full in all cases.

The condition is "rapidly fatal in the vast majority of cases," Dr. Burket states.

It is so rare, he says, that most physicians have never heard of it and are not likely to think of it as a possibility when diagnosing the patient's condition.

Any case with a history of taking bicarbonate of soda followed by sudden abdominal pain and severe and dramatic onset of shock and prostration should be immediately considered a case of spontaneous rupture of the stomach, Dr. Burket warns.

Dr. Burket's patient had taken a bottle of citrate of magnesia at three o'clock in the afternoon. About 7:30 that night, because she still had discomfort, she took about a tablespoonful of bicarbonate of soda in an unusually large glass of water.

Immediately after drinking it she collapsed on the floor in severe agony, turned blue and had labored breathing. Her skin became cold and clammy and her pulse was barely perceptible.

Operation was scheduled for two to three hours later, but her condition became worse and she became unconscious even before the anesthetic was given. The surgeon decided to operate anyway because he was almost certain one of the internal organs was ruptured. Rupture of the stomach, however, was not even considered, and was not diagnosed until the lesser peritoneal sac, containing the internal organs, was opened.

Here foamy white material was found. It was undoubtedly bicarbonate of soda with enclosed fine gas bubbles, Dr. Burket states. The gas bubbles boiled out through the cut. Chewed undigested food was removed by the handful from the peritoneal cavity into which it had escaped when the stomach burst.

A rent in the stomach about two inches long was found. This was sewed up but while the abdominal wound was being closed the patient rapidly became worse in spite of being given over a pint of blood plasma. She died before the surgeon had finished closing the wound.

Science News Letter, January 8, 1949

The familiar bunch of *bananas* hanging in the market is upside down from the position in which it grew on the banana plant.

A new *tire* recapping material, which is said to increase traction on icy roads by 30%, is high quality tread stock containing thousands of pieces of rock salt; in wearing the salt is released to form surface pores to grip the road surface.

Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W. Washington 6, D. C. Ask for free publications direct from issuing organizations.

ANNUAL REPORT OF THE BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION, 1947—*Gov. Printing Office*, 471 p., illus., $2.00. Contains research reports on a variety of timely topics, including atomic energy, plutonium, silicones, biology of Bikini and reaction-propelled airplanes.

THE EARTH AND MAN: A Human Geography—Darrell Haug Davis—*Macmillan*, rev. ed., 696 p., illus., $5.50. A college text.

FILM AND EDUCATION: A Symposium on the Role of the Film in the Field of Education—Godfrey M. Elliott, Ed.—*Philosophical Library*, 597 p., $7.50. Each of the 37 chapters is contributed by a specialist in one of the various fields covered. The chapter on science films is by Oreon Keeslar of the Kern County Schools, Calif.

HANDBOOK OF URANIUM MINERALS: An Exposition and Catalog of the Uranium and Thorium Minerals, Including their Occurrence, Detection, Location and Exploration—A Guide for the Prospector and Miner—Jack De Ment and H. C. Dake—*Mineralogist Publishing Company*, rev. ed., 96 p., illus., paper, $2.00. For prospectors, students and others who may be searching for uranium in response to the AEC offer of $10,000 for discovery of fruitful deposits.

HIGH-POLYMER PHYSICS: A Symposium—Howard A. Robinson, Ed.—*Chemical Pub. Co.* 572 p., illus., $12.00. The physicist has had the help of the chemist in making the strides reported here.

INVENTORY OF MAJOR LAND USES IN THE UNITED STATES—L. A. Reuss, H. H. Wooten and F. J. Marschner—*Govt. Printing Office*, 89 p., illus., paper, 25 cents. In the 1,905 million acres of the United States there is the utmost variation in climate, soil, slope of surface and development and use of land.

PROCEEDINGS OF THE INDIANA ACADEMY OF SCIENCE, VOLUME 57—P. D. Edwards, Ed. *State Library, Indianapolis*, 207 p., illus., $3.00.

Science News Letter, January 8, 1949

PSYCHOLOGY

Why Some People Drink

➤ AMERICAN drinkers are divided about evenly between those who drink "to be sociable" and those who drink because it "makes me feel good," "I like it" or other individual reasons.

This was discovered in a survey made for Rutgers University in New Brunswick, N. J., by the National Opinion Research Center. Results of the survey are discussed in the QUARTERLY JOURNAL OF STUDIES OF ALCOHOL (Dec.), by three Rutgers sociologists.

Most of the social drinkers said they drank "just to be sociable", or "because all our friends drink," or "to be a good sport."

But a full two percent of all the 1,744 drinkers interviewed declared, "I drink to keep my husband company." Others said they drank only on festive occasions, because they were "brought up with it" or "as a business courtesy."

Among the non-social drinkers who gave individual reasons for drinking, the most frequent response was that it "makes me feel good." More than one in every 10 explained, "I like it."

Six percent of the drinkers pointed out as a reason for drinking alcoholic beverages that they quench thirst.

Appetite stimulation and other health reasons were also listed by some drinkers.

Social drinkers offered reasons ranging from a Pennsylvania housewife's explanation to the statement of a young ex-GI in New York City.

"People think you're dead if you don't drink", said the housewife.

The New Yorker explained, "Liquor is always sold in the places I frequent. You can't have a soda in a night club. It's just not done."

Listed by the sociologists as individual, non-social reasons for drinking were the replies of a domestic employee in Oklahoma and a building contractor in North Carolina.

The Oklahoman told an interviewer, "A bottle of beer makes me feel rested after a hard day's work. Then I can get up and clean my house."

The contractor said, "When I drink I feel important."

Women gave social reasons more frequently than men. Younger people, both men and women, tended to be social drinkers. And the figures showed that the social drinkers drank less often. A majority of the daily drinkers gave individual reasons, while social reasons dominated in the once-a-month and less groups.

In legally dry areas, the larger number of drinkers had their own reasons, while social drinking was more important in "wet" areas.

Drs. John W. Riley, Jr. and Charles F. Marden and Marcia Lifshitz, Rutgers sociologists, point out that the importance of social reasons for drinking is that social pressures may be used to help solve the drinking problems of drunkenness and alcoholism.

What is needed, they find, is a new set of group sanctions regarding drinking.

For one social control on drinking, the sociologists suggest a simple rule of etiquette: offer non-alcoholic as well as alcoholic beverages, so that you are never insisting that anyone drink. This rule, they point out, will help both the "dry" alcoholic, who has regained his sobriety but should not take one drink, and the person who has been ordered not to drink for physical reasons.

Science News Letter, January 8, 1949

ASTRONOMY

Non-Astronomers Honored By Astronomical Society

➤ THE FIRST two non-astronomers to be chosen patrons of the American Astronomical Society, meeting in New Haven, Conn., were announced by Dr. Harlow Shapley, director of the Harvard College Observatory and ex-president of the Society.

The new patrons are Judge H. S. Hulbert of Detroit and Dr. George Russell Agassiz, Boston, Mass. Judge Hulbert was one of the three persons responsible for the creation of the University of Michigan's McMath-Hulbert Observatory at Lake Angelus, near Detroit. Dr. Agassiz is vice-chairman of the Committe to Visit the Department of Astronomy of the Board of Overseers of Harvard College.

Science News Letter, January 8, 1949

Science Service Radio

➤ LISTEN in to a discussion on "Blood, The Fluid of Life" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST, Saturday, Jan. 15. Dr. Ross T. McIntire, administrator of the National Blood Program of the American Red Cross, will be the guest of Watson Davis, director of Science Service. Dr. McIntire will discuss the Red Cross program to provide blood to save those injured in accidents or needing medical treatment and forecast the growing use of blood in the treatment of illness.

Science News Letter, January 8, 1949

The mysteries of mathematics are revealed in a series of twenty chapters on "THE MEANING OF COURSES IN MATHEMATICS" now running in the MATHEMATICS MAGAZINE. If you never understood mathematics well or want to understand it better, here is your opportunity at trivial cost. No special training is required to understand and enjoy these articles, ranging from beginning algebra through most graduate courses, and colored by the individualities of the sixteen mathematicians who are writing them.

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COMBINATION inhaler-vaporizer for the relief of throat irritation needs no heat to create the vapor, vaporizing medicines being put on a cotton pad inside. Dual tubes with special plastic nasal tips permit it to be used as an inhaler; with the cover removed it becomes a vaporizer for children.

Science News Letter, January 8, 1949

DOOR KNOCKER, that chimes instead of knocking, resembles the authentic colonial knocker on the outside, and a small flat chime box on the inside. When the knocker is raised and dropped, two clear harmonizing chime tones which can be heard throughout a house are given off.

Science News Letter, January 8, 1949

TELEVISION magnifier for the smaller types of receivers enlarges the picture for the size of images on seven-inch tubes to the approximate size of those on 12-inch tubes. It is an improved type of oil-filled plastic lens, developed to provide freedom from optical distortion.

Science News Letter, January 8, 1949

SWING-UP SUNGLASSES, which in the elevated position become visors as

shown in the picture, offer protection against glare and are available in green, red and amber. Their plastic brow bars make them easy to wear. Lens, attached to a brow bar, is hinged to a second bar underneath.

Science News Letter, January 8, 1949

FIRE EXTINGUISHER, so inexpensive that many may be installed in a home, resembles an ordinary preserving can in appearance and is operated by pulling a trigger which releases an 18-foot chemical stream through an opening in the top. The can is not refillable; it contains carbon tetrachloride principally, with carbon dioxide as a propellant.

Science News Letter, January 8, 1949

EYEGLASS CLEANER, for use once a day, is a chemically treated cloth which contains a harmless synthetic detergent that coats the lens with a transparent film to keep moisture from gathering on it. This anti-fog cloth also cleans and polishes the glass.

Science News Letter, January 8, 1949

ODORLESS GERMICIDE, chemically a substituted phenol, is effective against both fungi and bacteria and is non-irritating in usage dilutions. It is a dry, non-dusting, flaked solid, usable with commercial dispersing agents, and has applications ranging from sanitizing restrooms to deodorizing garbage cans.

Science News Letter, January 8, 1949

• *Do You Know?* •

It takes about 2.7 acres of land to produce *food* for one American.

Several species of *fern* are edible; others are used in basket-making.

Nearly one-third the *trucks* used in America are owned by farmers.

Of the 76 *vessels* used in the Bikini atom bomb test, 12 are still afloat.

The *African violet*, now a favorite houseplant, does not need direct sunlight.

Liquid ammonia is increasingly used as a source of nitrogen for fertilizing crops.

Maine has at least 48 different species of fern, 16 of which have some economic importance.

There are now about 60,600,000 *telephones* in the world, 60% of them being in the United States.

Carrot-eating in America has become popular; over 700,000 acres of land was used last year to grow this vegetable.

Brazing in high-vacuum furnaces from which practically all air has been removed permits hard solder joints to be made with virtually no oxidation.

Australia, when white settlement began 160 years ago, had some 300,000 natives; today native population is estimated at 50,000 full-blood *aborigines*.

Federal areas under the administration of the U. S. National Park Service bring in revenues which are sufficient to pay about one-half the cost of administration.

America stands first in the world production of *electricity*, making about 45% of the total; American production is about six times that of Russia, the second in rank.

Rubber is entering the road-surfacing field; when five to ten percent of rubber powder is added to the asphalt used, riding qualities are improved and the surface is less affected by winter cold and summer heat.

Banana plants are not grown from seed but from a chunk of rootstock known as a rhizome; the rhizome, which must have an "eye" similar to that of the potato, is planted with its eyes down, under a foot or so of soil.

Science News Letter, January 8, 1949

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